

Some preliminary results on BB experiments at SPS in 2008

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Outline

- 1 Introduction to the experimental setup
- 2 Experimental results
- 3 Some conclusions

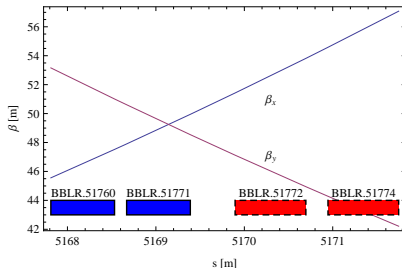
This year we had **5 MDs in the SPS** (in parallel with other users) for beam-beam studies. We may have one more MD session in next months.

In SPS we have 4 wires grouped in two families:

- **BBLR1** (2 wires, each one is 60 cm long) (**FIXED**)
- **BBLR2** (2 wires, each one is 60 cm long) (**MOVABLE**).

For each family there is one power supply .

The layout...



The BBLR1 are in BLUE, the BBLR2 are in RED.

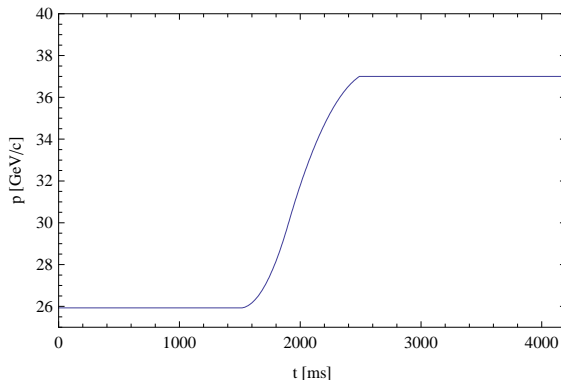


Some SPS parameters...

- beam species : Proton
- beam momentum: 37 GeV/c
- chromaticities: ≈ 3
- rms normalized emittances: 4-6 $\mu\text{m rad}$ ($\epsilon_n = \frac{\sigma^2 \gamma}{\beta}$)
- no. of bunches: 12
- average no. of particles per bunch: $\approx 3 \times 10^{10}$
- rms bunch length: ≈ 4 ns
- γ_t : 22.81
- RF frequency: 200.4 MHz
- Harmonic number: 4620
- RF voltage: 2.63 MV.

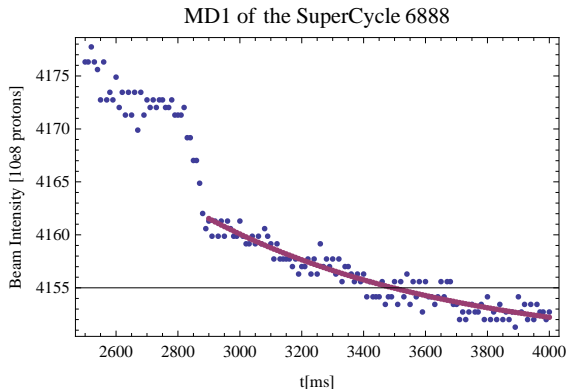


The flattop at 37 GeV/c is 1.7 s long



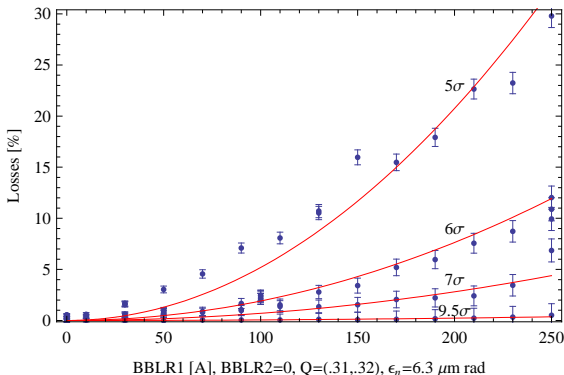
We used the flattop at 37 GeV/c (1.7 s): the cycle lasts 4 s and the SuperCycle ≈ 50 s.

Our fundamental observable...



OBSERVABLE: losses between 2900 and 4000 ms (it corresponds to wire's flattop).

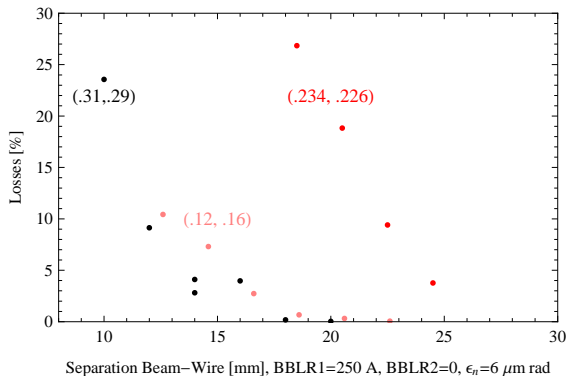
Current scan at different distances



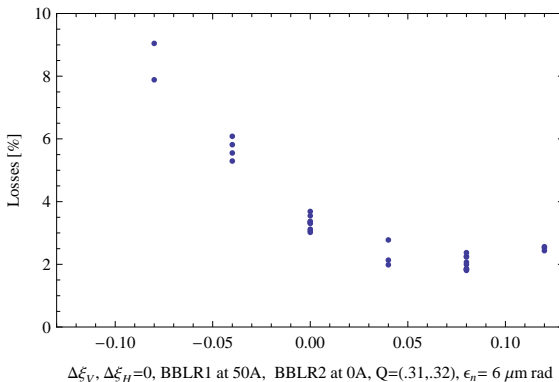
The 2-dimensional fit proposed is $0.077e^{-D}I^2$ (where D is the separation beam wire (in σ) and I is the wire current (in A)).



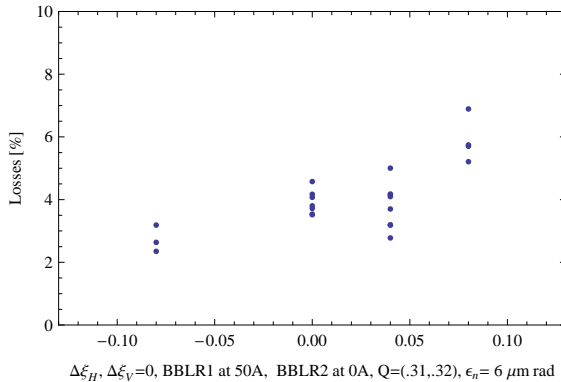
Tune scan at different distances



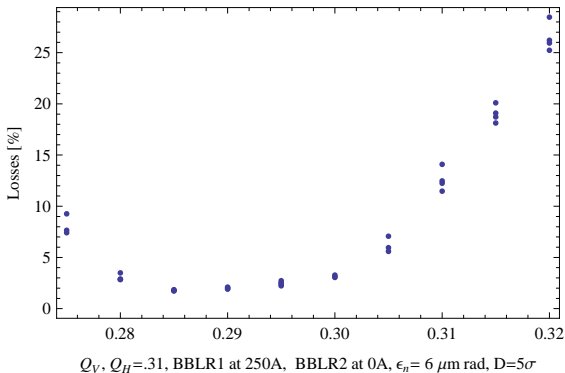
Vertical chromaticity scan



Horizontal chromaticity scan

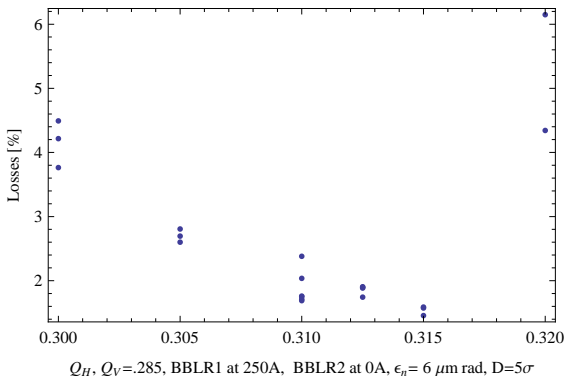


Vertical tune scan



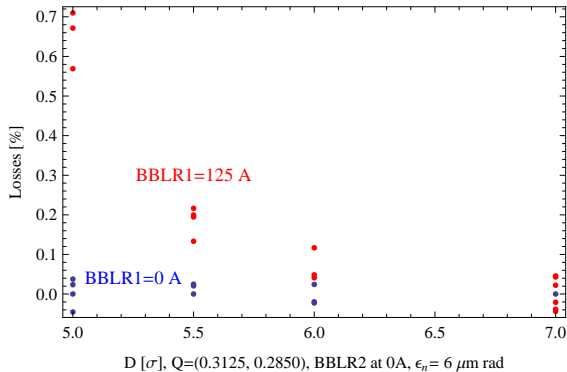


Horizontal tune scan

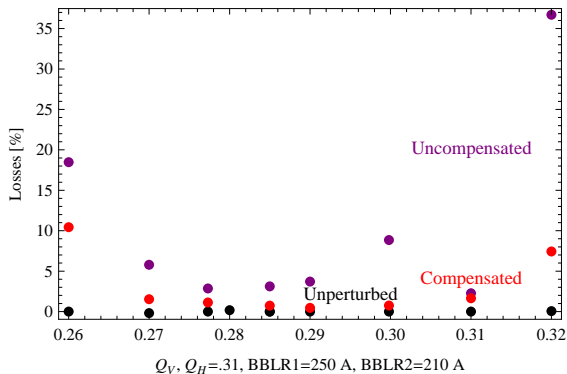




Distance scan with optimized tunes



Compensation as function of the tunes



- The analysis of the results is still on going
- The simulation study for reproducing them still to be planned
- The data seem to confirm that the WP is crucial (1 order of magnitude on the effect)
- The data seem to confirm that the chromaticity does play a relevant role
- The compensation 250-210 A is very strange: more calibration studies required (next MD?)
- The compensation depends on the tunes...